



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

it is at fault in its three strongest chapters. It is luminous throughout, and thoroughly readable. It is, as we said, valuable and timely, because it is itself an interesting method of ethical science, and because it is immensely stimulating.

J. D. LOGAN.

UNIVERSITY OF SOUTH DAKOTA.

Studies in Auditory and Visual Space Perception. By ARTHUR HENRY PIERCE. Longmans, Green, and Co., New York, London and Bombay, 1901.—pp. vii, 361. \$2.00, net.

This book consists of two parts, entitled respectively, "The Localization of Sound," and "Studies in Visual Space Perception." The first part is a systematic discussion of the whole subject of auditory perception of space. Earlier investigations are reviewed, original experiments are reported, and a final theoretical interpretation of all the available facts is undertaken. The second part is, as its title indicates, a less systematic treatment of certain special phases of visual perception. Various geometrical illusions are experimentally examined; no general theory, however, is presented.

The book is the first regular publication in compliance with the requirement made of each Kellogg University Fellow of Amherst College. A number of the papers which are here reproduced in enlarged form appeared originally in the *Psychological Review* and in *Science*. The appearance of the book now makes it possible to see in its entirety the net output of the generous period of study provided by the fellowship at Amherst. This net output is a distinct contribution to psychology. Especially the first part of the book, which deals with a group of complex and difficult problems, is valuable as a thoroughgoing treatment of a subject nowhere else discussed with such fullness, either in our own or in any foreign scientific literature.

The author's general conclusion on the conditions of auditory localization may be briefly summarized as follows. It is not merely the ratio between intensities of sensations received in the two ears which determines auditory localization. The difference in intensities is of importance, but equal importance is to be attached to "that [qualitative] characteristic which the sound possesses in consequence of modifications wrought by the influence of the form and position of the head and pinna" (p. 149). Movement factors which have sometimes been included as immediate elements in auditory localization are rejected. It is denied that movements toward auditory objects are reflex. Such movements are cultivated as localization becomes more and more highly developed. Movement thus aids in the arrangement and

definition of particular positions within auditory space, but the auditory space in its original and essential character is independent of movement factors.

These conclusions our author holds to be nativistic in their tendencies, and he does not hesitate to accept this tendency in its fullest degree. Thus, he writes on page 187: "Accordingly we shall assume that auditory impressions originally possess positional characteristics, or that they are natively endowed with the attribute of externality . . . On this basis our problem is to show how from a condition of general, indefinite externality, sounds come to possess more or less definite and well-ordered localizations in a spatial system."

The nativistic conclusion is, furthermore, vigorously supported on grounds other than the mere tendency of the general conclusions. Professor Pierce has one line of argument which he pushes to the front as of conclusive significance. Briefly stated it is as follows: Auditory space is, in so far as it consists in intracranial localizations, quite independent of visual, tactual, and motor complications. A sound produced by two telephones which are in direct contact with the ears, is localized inside the head. The space inside the head cannot be assumed to have any direct sensory relation with vision, or touch, or movement. Since, however, this intracranial localization is just as direct and typical as any form of auditory localization, it follows that auditory space in general must be, in its essential nature, independent of touch, vision, and movement. The whole question thus solves itself through the discovery of this sphere of pure auditory space.

This argument has a kind of conclusive ring about it which one would gladly allow to convince him, were it not for the difficulties which arise when he tries to get back from this separate and unique auditory space to the real space of experience. Space as we experience it in adult life is neither visual, tactual, nor auditory. It is a form of all experience. Indeed, it is only through their common arrangement in this common form which is not identical with any sensory factor, that disparate sensory qualities come to be recognized as related. If one assumes the spatial relation between auditory impressions and visual impressions as the necessary and important fact in ordinary experiences, and then emphasizes the absolute separation between the two kinds of impressions as the fundamental fact in determining his definition of the original spatial *quale*, obviously he has yet to show the relation between his defined space and ordinary, experienced space.

Professor Pierce gives some outline of the method that he would

follow in extricating himself from this difficulty. It is practical life, he says, with its necessities of reaction, which impels us to render more and more definite the vague localizations of the original auditory space. Thus movement and auditory space get related. But auditory space is not as helpful in working out our practical adaptations as is visual space, so the forms of reaction which we most commonly cultivate in connection with auditory localizations are such as will bring the eyes into line with the objects heard. Auditory localization thus passes through movement into visual localization. Auditory space is not dependent, it is merely inferior in its degree of development. The fundamental difficulty in criticising such a theory is that it has so many different stages of experience to which it can apply its term space. Is space the organized externality of ordinary life? No, it is something more primitive, answers the nativist. And, if you ask what that more primitive experience is, he tells you that it is something which never continues in its original form, but gets itself related to some form of action or some more complete form of perception. Again, if we consider the matter closely, a related question arises as to whether there is not ground for the assertion that intracranial space is after all in its developed form quite as closely related to vision as any other case of auditory localization. Can one localize inside the head without having the usual visual and tactual world as a general setting for the localization? If we try to shut out this larger world, are we not committing in another form the fallacy of using the term space for different ranges of perception? Is not, in fine, adult space always the whole space of experience? What does it mean to have discovered a limited area within the head that falls out of the general scheme of things and is not either in its development or in its present relations complicated with tactual or visual factors? To the present reviewer, the attempt to isolate intracranial space and mark it off as unique involves the author in innumerable difficulties which are too lightly overlooked.

The second part of Professor Pierce's book contains many discussions which are of interest to those who have taken up the detailed investigation of geometrical illusions. His explanation of Münsterberg's checker-board illusion is that the deflection of the line is due to irradiation. The illusory movements which appear when one moves the point of fixation across a Zöllner figure are explained by successions of images analogous to those which would arise if one were looking at a rotating screw. The Poggendorff illusion is due to a variety of causes, among which the false estimation of the angles seems to be of minor importance, and the overestimation of the distance between the

points of interruption in the oblique line seems to be of great importance. There are also discussions and descriptions of less common illusions.

In reaching his conclusions, and as a result of his experiments, Professor Pierce has not infrequently found it necessary to reject both the observations and inferences of earlier investigators. Perhaps it may not be out of place for me to say a word in defense of some of the rejected conclusions. In doing this I shall ask indulgence for the use of the first personal pronoun. Other workers in this field would doubtless raise similar objections to being so easily set aside, and I shall merely attempt to offer a typical counter criticism, holding that in doing this, I act merely as a representative of the whole group of vanquished ones. And I shall select a minor case as an illustration because it lends itself to brief treatment. For example, a number of explanations of the movements in the Zöllner figure are criticised for various reasons; mine is rejected because the verticals in the figure can be removed without destroying the possibilities of such apparent movements. The removal of the verticals is held to render impossible a false estimation of angles, and this is said to be fatal to my explanation. The following is a quotation from my article. "The successive fixation of certain points in the figure brings out the illusion of length first on the side of an acute angle, then on that of an obtuse angle. The angles do not suffer any further change by such successive fixation, but the presence of a neutral point of reference *gives clearness to the illusions of length* (italics new), that is, the original source of the angle illusion appears in its simplest form."¹ The removal of the verticals may render a false estimation of angles impossible by destroying the angles used for the purposes of description in the explanation just quoted, but if the fixation point crosses the oblique line of the Zöllner figure in such a way as to give successive opportunities for false estimation of length, which estimation of length was all along recognized as the fundamental factor, it is not easy to see why the explanation quoted should be so summarily rejected.

In much the same way a number of the other detailed criticisms might be answered, but I shall refrain from entering into the special discussion in a general review. Even the continuation in this volume of the discussion which Professor Pierce and I carried on in the *Psychological Review* shall remain unanswered here. On one point at least there can be nothing but agreement: Professor Pierce has, by his contributions and discussions, made it clearer than ever before that

¹ *Psychological Review*, Vol. VI, p. 260.

there is, in the sphere of visual space perception a rich field of psychological investigation yet unmastered. Mutual criticism certainly will detract nothing from the impersonal character of conclusions, if such criticism is conducted in the spirit which Professor Pierce everywhere manifests. The difficulty which will always present itself will be the difficulty of getting at the differences in the views of different writers with mutual clearness, and certainly, as I have attempted to illustrate by the single example given, one is justified in demanding of our author a somewhat more liberal consideration of the explanations which he criticises.

There is one use to which a book of this sort may be very advantageously put. It furnishes just the kind of material to put into the hands of a class somewhat acquainted with laboratory methods, and about to enter upon an intensive study of some particular subject. The reviews give some suggestion of what has been done before, and introduce the student to the method of acquainting himself with the status of particular psychological problems. The original investigations furnish suggestive models; and the conclusions reached offer excellent material for the development of careful personal judgments. It is to be hoped that our psychological literature will be enriched by other monographs of this type.

CHARLES H. JUDD.

UNIVERSITY OF CINCINNATI.

L'année philosophique, publiée sous la direction de F. PILLON.
[Bibliothèque de philosophie contemporaine.] Paris, Félix Alcan,
1901.—pp. 314.

Besides the review of French philosophical literature for the year 1900, the current number of *L'année philosophique* contains four essays: "Les mythes dans la philosophie de Platon," by V. Brochard; "Sur une des origines du Spinozisme," by O. Hamelin; "Essai sur les catégories," by L. Dauriac, and "La critique de Bayle; critique du spiritualisme cartésien," by F. Pillon. The third of these articles is constructive, the other three critical. All present interesting material, much of which reflects the well-known attitude of Renouvier and his school.

M. Pillon's account of Cartesian spiritualism and Bayle's criticisms upon it is not only a valuable aid for the understanding of the philosophy of the period, but is also of importance for the thought of the present, since it constantly compares this earlier form of idealism with that of Renouvier. The fundamental doctrine of the Cartesian spiritualism is the distinction between two substances, the one spiritual with